

UNITED STATES MARINE CORPS
Basic Officer Course
The Basic School
Marine Corps Combat Development Command
Quantico, Virginia 22134-5019

B2161

HEAVY MACHINE GUNS 2

Student Handout

1. **Introduction.** The M2 .50 caliber and MK19 40mm heavy machine guns are found throughout all major subordinate commands (MSC) within each division, aircraft wing and force service support group. Properly employed, heavy machine guns provide a high volume of accurate fire in support of the infantry in both the offense and defense. Their long-range, close defensive, and final protective fires constitute an integral part of the defense against enemy attack for combat support and combat service support units. Additionally, the heavy machine guns can be effectively employed in an anti-air defense role against slow moving, low flying aircraft and in a convoy security role.

Therefore, because of widespread fielding of the heavy machine guns throughout the FMF and their flexibility for employment, it is imperative that every lieutenant, regardless of MOS, becomes intimately familiar with the operation and capabilities of these weapon systems.

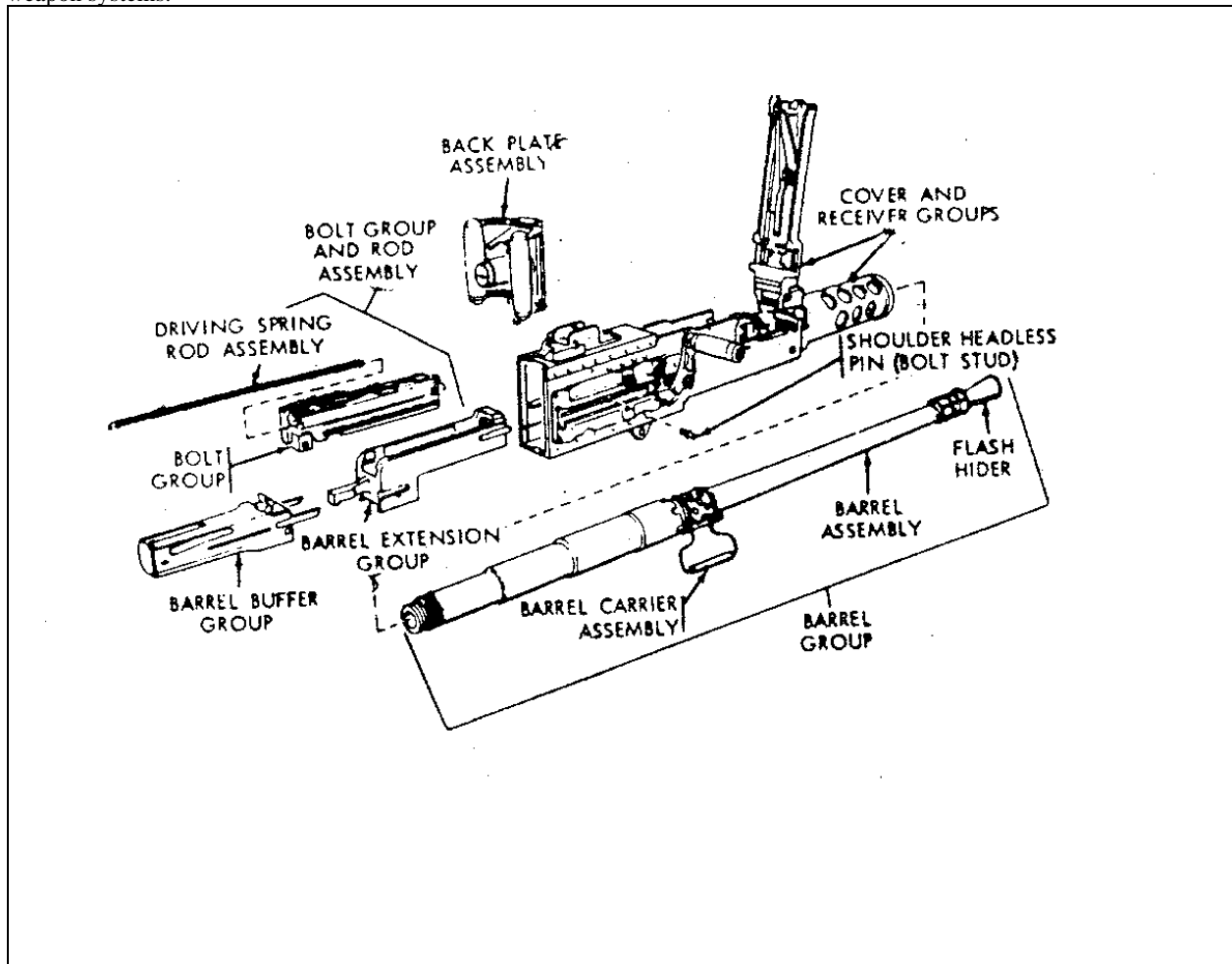


Figure 1. Main groups and assemblies of M2 HB, .50 Cal MG

2. **General Disassembly for M2 HB .50 caliber machine gun**

- a. Determine if weapon is clear.
- b. Remove the barrel group.
 - (1) Hold charging handle to the rear until the lug on the barrel locking spring aligns with the 3/8 inch hole in the right sideplate of the receiver.
 - (2) Unscrew barrel from the receiver.
- c. Remove the backplate group.

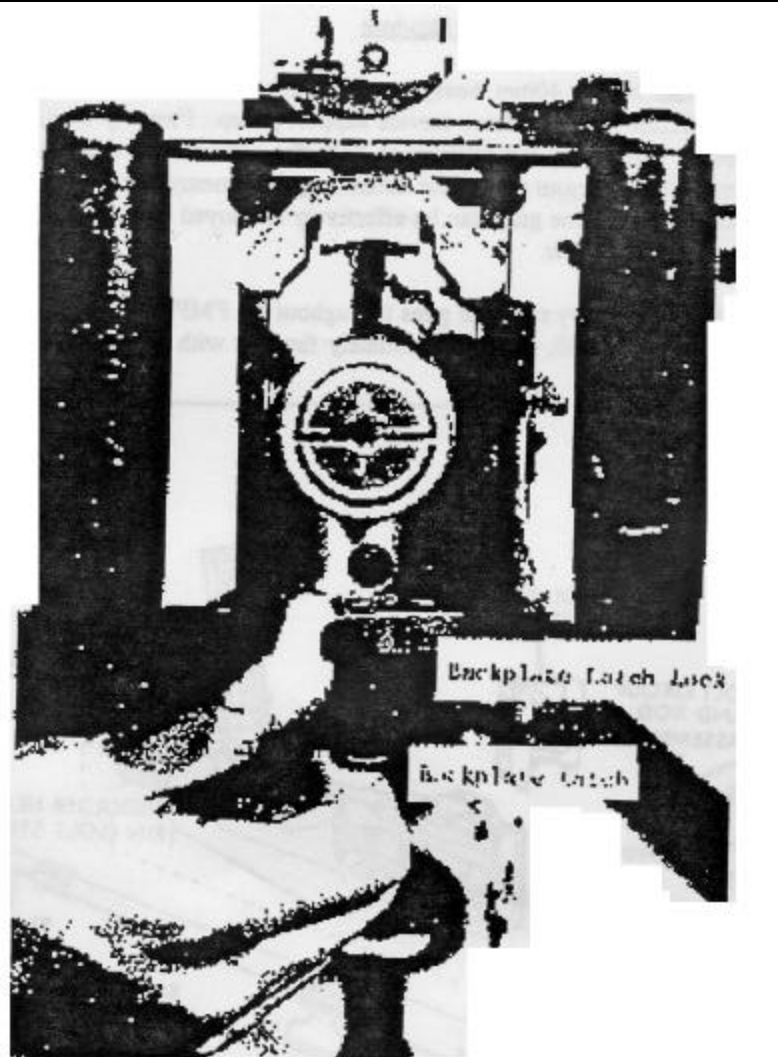
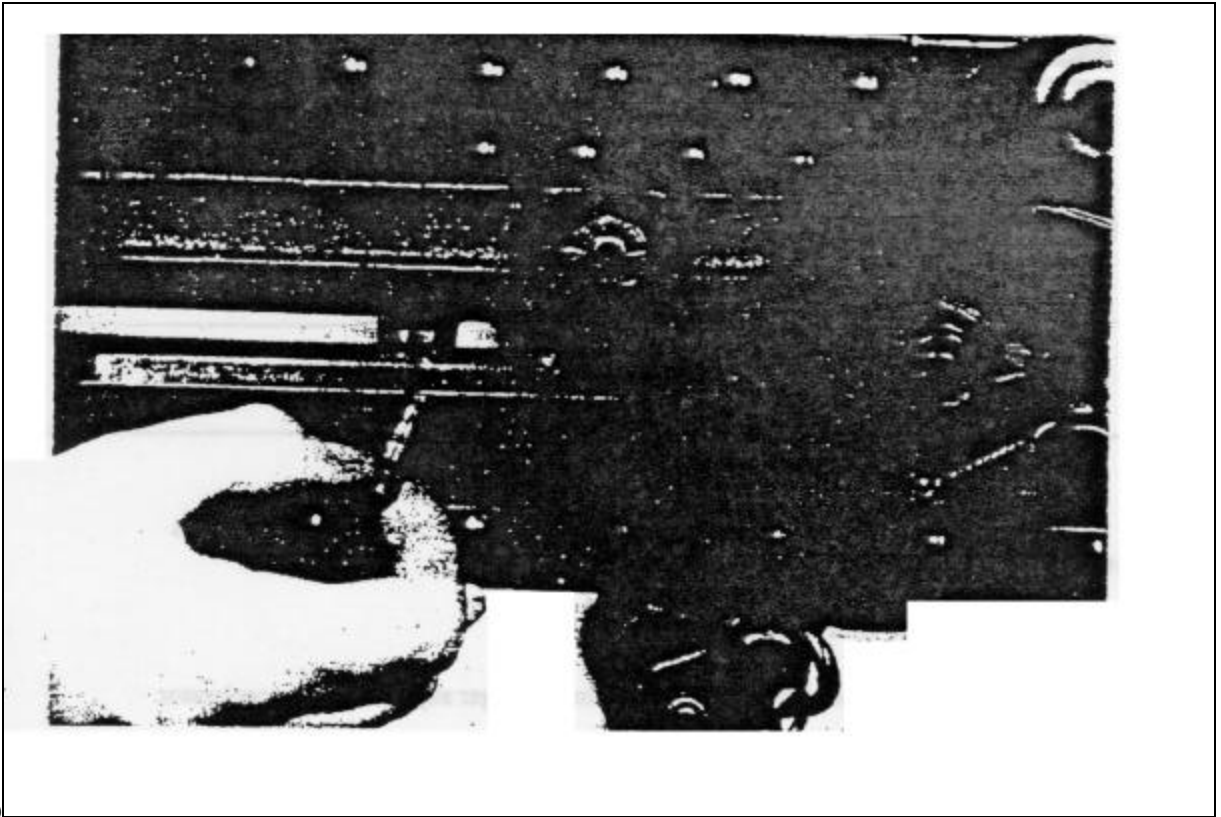


Figure 2. Backplate group

- (1) Return bolt to forward position.
- (2) Pull out on backplate latch lock and up on backplate latch. (See Figure 2.)
- (3) Slide backplate group up and out of receiver.
- d. Remove the drive spring rod assembly.
 - (1) Push in on head of assembly.
 - (2) Push to left and remove from rear of bolt group.
- e. Remove the bolt stud.
 - (1) Free bolt from the barrel extension by giving the charging slide handle a quick jerk.
 - (2) Align the shoulder on the bolt stud with the clearance hole in the bolt slot on the right side of the receiver. (See Figure



3.)

Figure 3. Removing bolt stud

- (3) Pull bolt stud straight out to the right.

f. Remove the bolt group.

- (1) Slide bolt to the rear and out of the receiver.
- (2) Place bolt on its right side so that the extractor will not fall from the bolt.

g. Remove the barrel buffer and barrel extension groups.

(1) Insert the end of a pointed object (cleaning rod or combination tool) through the hole in the lower rear corner of the right side of the receiver and push in the barrel buffer body lock.

(2) Place hand inside receiver and push barrel extension group and barrel buffer group to the rear.

(3) Separate the two groups by pushing forward on the accelerator tips.

(4) Pull the barrel buffer assembly from the rear of the barrel buffer body group. The barrel buffer will NOT be disassembled.

h. General disassembly is now complete. The receiver group is NOT broken down except by qualified ordnance personnel.

3. **Reassemble.** To assemble the weapon, replace the groups and assemblies in the reverse order of disassembly.

a. Assemble the barrel buffer group.

(1) Keeping the key on the spring guide to the right, insert the buffer assembly into the buffer body group.

(2) Turn the barrel buffer tube until the screwdriver slot is vertical and the arrow points to the right.

(3) Push the barrel buffer assembly fully into the buffer body.

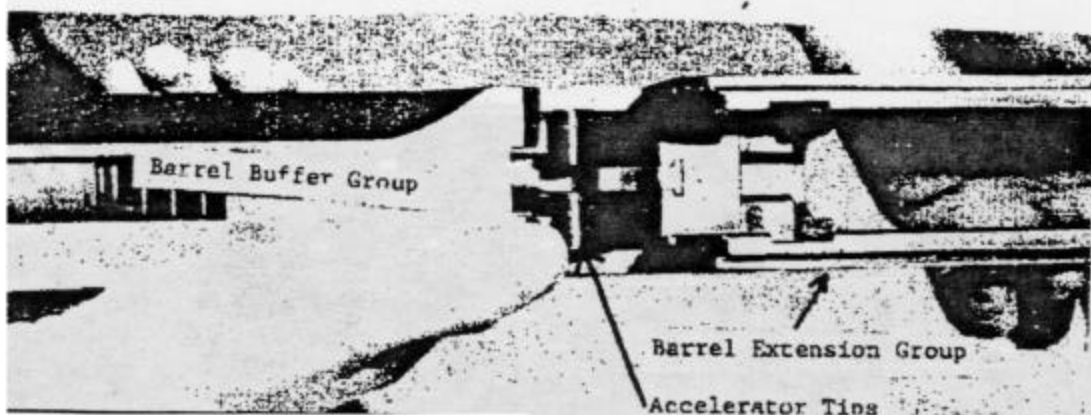


Figure 4. Barrel buffer and extension

- b. Replace the barrel buffer and barrel extension groups.
 - (1) Join the two groups together. (See Figure 4.)
 - (a) Hold barrel buffer group in the right hand, with the index finger supporting the accelerator.
 - (b) Join the notch on the shank of the barrel extension group with the cross-groove in the piston rod of the barrel buffer assembly.
 - (c) At the same time, align the breech lock depressors with their guideways in the sides of the barrel extension, ensuring that the tips of the accelerator are against the rear end of the barrel extension.
 - (d) Push the groups together.
 - (2) Place the groups in the receiver.
 - (3) Push the groups forward until the buffer body lock snaps in place.
 - (4) When the parts are properly locked in place, the barrel buffer tube should protrude about 1 1/8 inches from the rear of the barrel buffer body group.
 - c. Replace the bolt group.
 - (1) Place the bolt in the receiver, with the top of the cocking lever forward and the extractor down.
 - (2) Push the bolt forward into the receiver.
 - (3) Press down on the rear of the bolt so that the forward edge clears the accelerator tips.
 - (4) Raise the rear of the bolt and continue to push forward until the bolt latch engages the notches in the top of the receiver.
- NOTE: The barrel extension, barrel buffer, and bolt groups may be assembled and returned to the receiver together.
- (5) Align the stud hole in the bolt and the clearance hole to replace the bolt stud. Ensure that the shoulder of the stud is inside the sideplate.
- d. Replace the drive spring rod assembly.
 - (1) Press up on the bolt latch (left lever inside upper edge on rear of receiver) and push the bolt all the way forward by pushing forward on the bolt stud.
 - (2) Place the drive spring guide in its hold in the bolt and push forward to drive the bolt forward.
 - (3) Press in and to the right on the head of the drive spring rod and put in place in the right sideplate.
- e. Replace the backplate group.
 - (1) Align the backplate group in its guideways and pull out on the latch lock.
 - (2) Tap the backplate group down into position, release the lock and pull upwards to ensure it is seated.

- f. Replace the barrel group.

(1) Pull the charging handle to the rear until the lug on the barrel locking spring is visible through the 3/8 inch hole in the right sideplate.

- (2) Screw the barrel all the way into the receiver; then unscrew the barrel two "clicks".

- g. General assembly is now complete.

4. **Headspace**

- a. Definition. Headspace is the distance between the face of the bolt and the base of a cartridge case when it is fully seated in the chamber. It is always set prior to firing the gun. The headspace and timing gauge is used to adjust the headspace and timing. (See Figure 5.)



Figure 5. Headspace and timing gauge

- b. Adjustment Procedures

(1) Raise the cover. Push back the charging handle (2-4 inches) so that the lug on the barrel locking spring is aligned with the 3/8-inch hole in the right side plate. Remember, to screw or unscrew the barrel, always align the lug on the barrel locking spring.

(2) Cock the gun. Pull the charging handle all the way to the rear. Once the bolt locks to the rear, continue holding the charging handle then depress the bolt release. Ride the bolt forward 1/2 way then allow the bolt to slam forward. If the bolt is not fully seated forward, repeat the task.

(3) Insert the no-fire gauge between the barrel extension and trunnion block. This will ensure that the locking surfaces of the breach lock and the bolt are in proper contact. This prevents the driving spring group and weight of the parts from giving a false determination.

(4) Raise the extractor. Insert the GO end of the headspace gauge in the T-slot between the face of the bolt and the rear end of the barrel. If the GO end of the gauge enters freely down to the center ring of the gauge, attempt to insert the NO GO end of the gauge. If the GO end enters and the NO GO end does not enter, correct headspace is set. (See Figure 6.)

(a) If the GO end does not enter the T-slot, unscrew the barrel one "click" then recheck headspace.

(b) If the NO GO end enters the T-slot, screw the barrel in one "click" then recheck headspace.

5. **Timing**

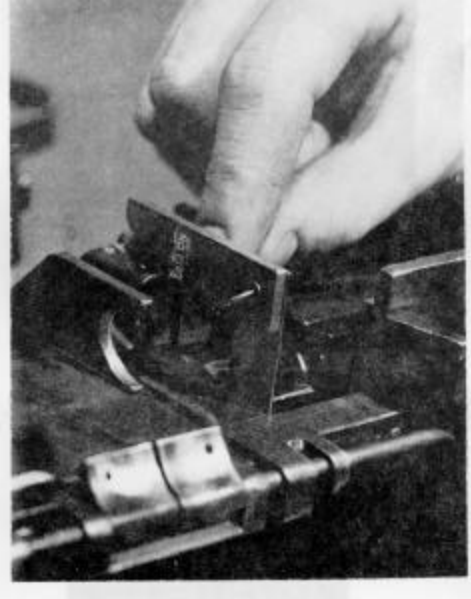


Figure 6. Placement headspace gauge

a. Definition. The adjustment of the weapon so that firing takes place just before the recoil parts are fully forward. When the gun fires on the FIRE gauge and does not fire on the NO FIRE gauge, we have correct timing. Timing must be checked and set each time headspace is set.

b. Adjustment Procedures

- (1) Ensure the gun has correct headspace.
- (2) Cock the gun. (Perform task as written on line number two in Headspace section.)
- (3) Raise the extractor and pull the charging handle until the barrel extension is about 1/4 inch from the trunnion block.
- (4) Insert the NO FIRE gauge between the barrel extension and the trunnion block, placing the beveled edge of the gauge on the barrel notches.
- (5) Allow the barrel extension to close slowly on the gauge.
- (6) Press the trigger, attempting to fire. If the weapon fires, you must set the timing. To set the timing:

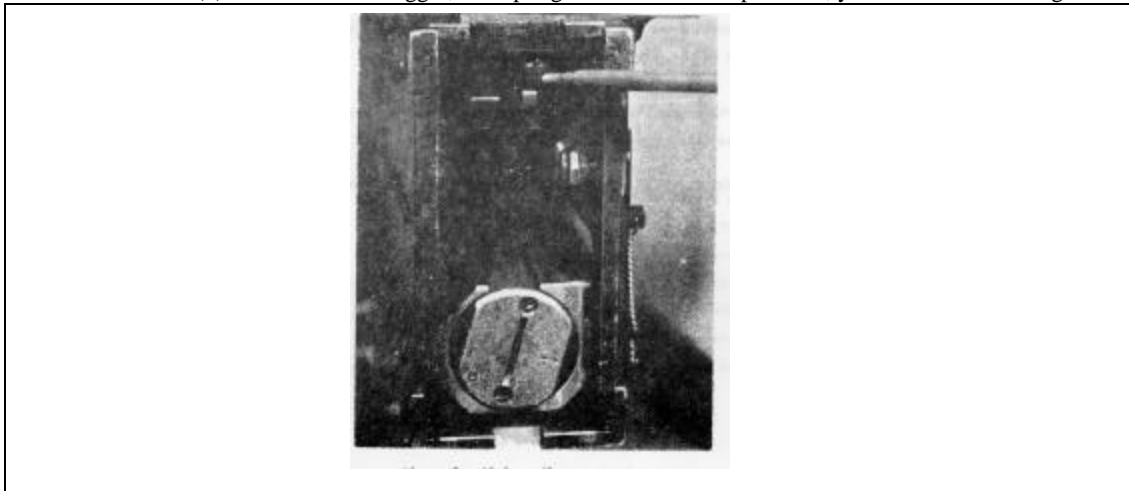


Figure 7. Timing adjustment nut

- (a) Cock the weapon. (Perform task as written on line number two in Headspace section.)
- (b) Insert the FIRE gauge between the barrel extension and the trunnion block and allow the barrel extension to close slowly on the gauge. (See Figure 6.)
- (c) Remove the backplate assembly (handles down).

- (d) Screw the timing adjustment nut counterclockwise until it stops. (See Figure 7.)
- (e) Press up firmly with your thumb on the trigger lever (right lever) attempting to fire.
- (f) Rotate the timing adjustment nut clockwise one (1) click at a time, each time pressing up firmly on the trigger lever, attempting to fire the weapon.
- (g) When the weapon fires, turn the timing adjustment nut two (2) additional notches clockwise and replace the backplate.
- (h) Recock the weapon and insert the NO FIRE gauge and attempt to fire the weapon. If the weapon fires then a mechanical defect exists and ordnance personnel must be notified.
- (7) Replace the NO FIRE gauge with the FIRE gauge and attempt to fire. The weapon should fire.
- (8) When all of the above procedures have been completed, the weapon is correctly timed.

CAUTION: Do not attempt to cock the M2 machine gun with the backplate off. The drive spring rod assembly could free itself and injure the operator.

6. **Prepare for Firing**

- a. Half-loading and loading.
 - (1) To begin loading of the M2 machine gun the bolt is forward and the cover is closed.
 - (2) The double-loop end of the ammunition belt is inserted into the feedway until the first round is engaged by the belt holding pawl.
 - (3) Pull the bolt to the rear and release the charging slide handle.
 - (4) If the bolt latch release lock is up, depress the bolt latch release and allow the bolt to carry itself forward. The machine gun is now half-loaded.
 - (5) Pull the bolt to the rear and release the charging slide handle.
 - (6) The weapon is now fully loaded and prepared to fire.
- b. Firing
 - (1) Depress trigger and the weapon will fire once. (semi-automatic)
 - (2) Depress the bolt latch release and the trigger at the same time and the weapon will fire automatically.

7. **General Disassembly of the MK 19 40mm Machine gun.** Disassembly begins with the bolt forward, cover raised after the weapon has been cleared.

- a. Remove the Bolt and Backplate Assembly.
 - (1) Ensure the weapon is clear.
 - (2) Pull straight out on the backplate pin utilizing a spent casing. (See Figure 8.)
 - (3) Pull out the backplate assembly until it "clicks." (See Figure 9.)
 - (4) Place the weapon on "F" (fire).
 - (5) Depress the sear, support the assembly with both hands and pull rearward to remove.

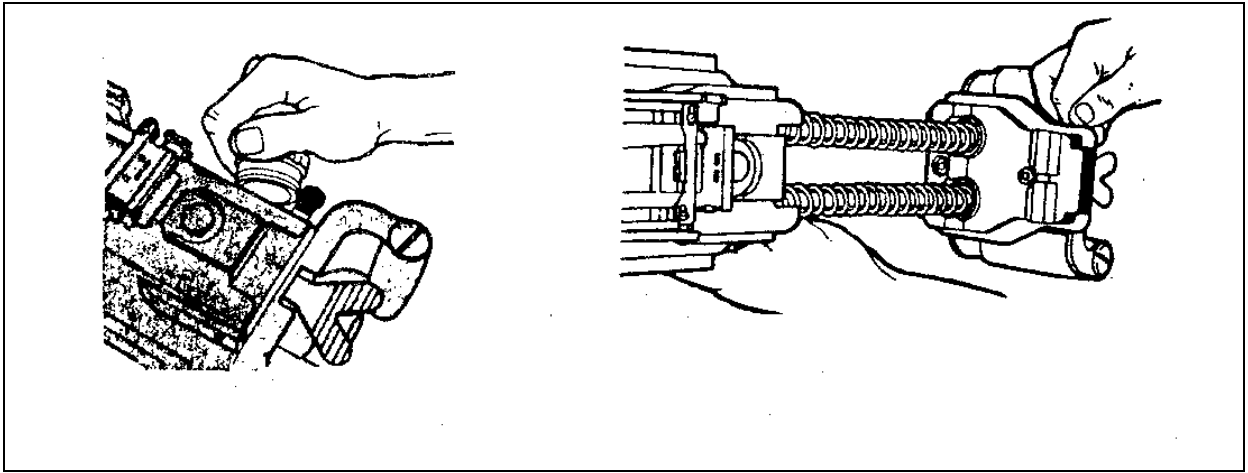


Figure 8. Removing backplate pin

Figure 9. Removing bolt

- b. Remove the Feed Slide Assembly and Feed Tray.
- (1) Hold the cover straight up.
 - (2) Remove secondary drive lever by pushing down on the pivot post (See Figure 10) from outside the feed tray cover and pulling the lever to the rear (See Figure 10) until it

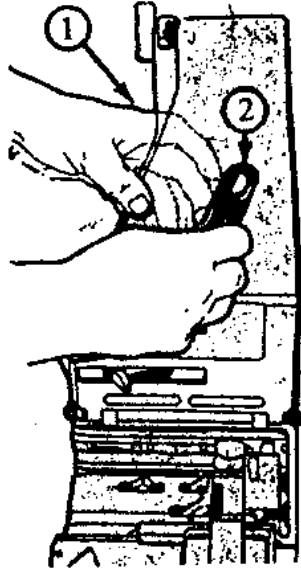


Figure 11. Removing secondary drive lever

disengages.

Figure 10. Removing secondary drive lever

- (3) Fold down feed tray with feed slide assembly.
- (4) Pull retaining pins straight out from both sides of cover. Note: Some retaining pins are put in by armory and cannot be removed. Therefore, the cover, feed slide, and feed tray cannot be removed.
- (5) Lift off cover. Cover must be at a 90 degree angle to weapon.
- (6) Lift off feed tray and feed slide assembly.

NOTE: It is permissible to separate the feed slide assembly from the feed tray. Move feed slide assembly to line up tabs with slots in tray, then lift off feed slide assembly.

- c. Remove the Primary Drive Lever and the Vertical Cam Assembly.

(1) Reach under the top of the receiver to locate the drive lever lock (1) (on the vertical cam assembly) and slide the lock rearward. (See Figure 11.)

(2) Press down on the primary drive lever's pivot post (2). This releases both the primary drive lever and vertical cam.

- (3) Pull out the lever and cam from the receiver (either end).

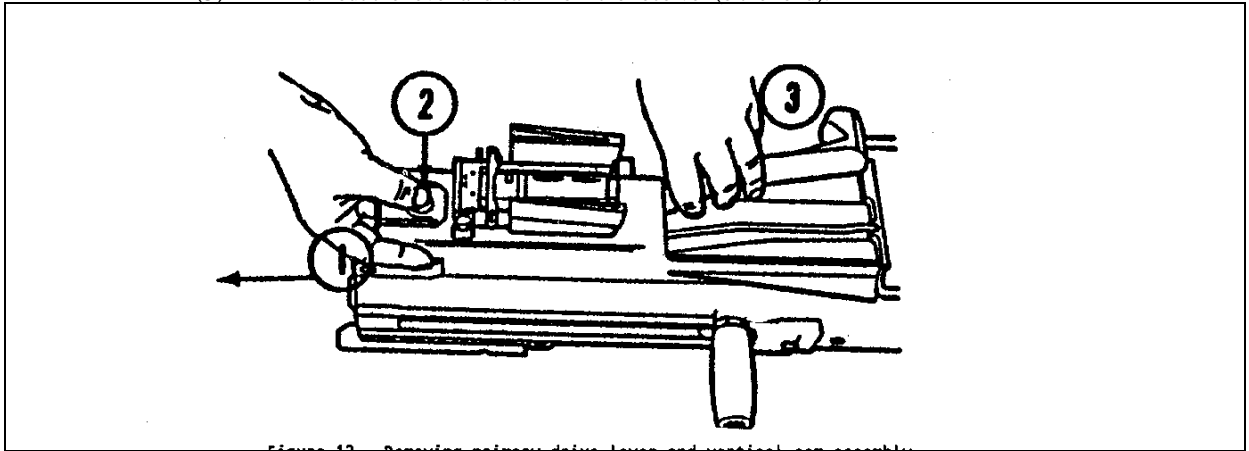


Figure 11. Removing primary drive lever and vertical cam assembly

- d. Remove Alignment Guide Assembly.

(1) Depress alignment guide spring (insert cartridge link or small tool into feeder mouth). (See Figures 12, 1).

(2) Slide alignment guide toward feeder mouth. (See Figures 12, 2.)

(3) Pull back and lift out alignment guide.

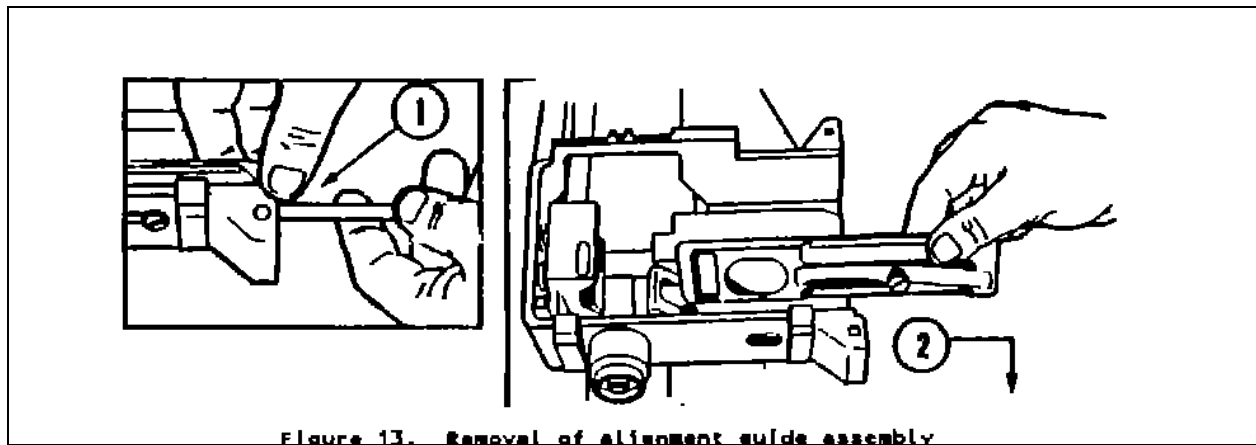


Figure 12. Removal of alignment guide assembly

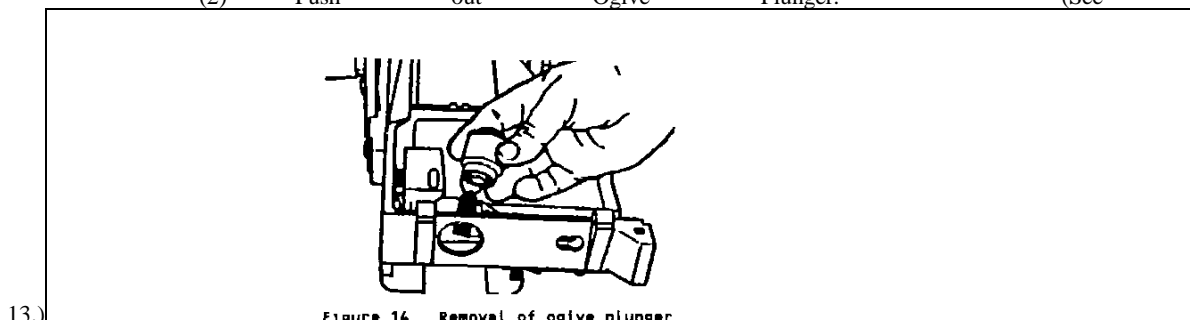
e. Remove Ogive Plunger.

(1) Alignment guide must be removed first!

(2) Push out Ogive Plunger.

(See

Figure



13.)

Figure 13. Removal of ogive plunger

f. Remove Round Positioning Block.

- (1) Depress round positioning block and slide it toward muzzle end of gun.
- (2) Pull round positioning block away from wall and receiver. (See Figure 14.)

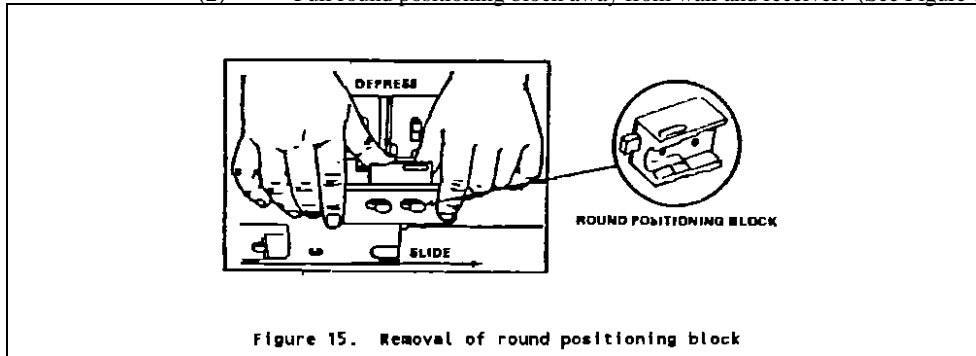


Figure 14. Removal of round positioning block

NOTE: At this time, remove the receiver from the MK 64 cradle if so mounted.

- g. Remove Charger Assemblies (both sides).
- (1) Retract lock plunger with link or spent case. (See Figure 15.)
 - (2) Slide charger all the way rearward.
 - (3) Pull charger away from receiver. (See Figure 15.)

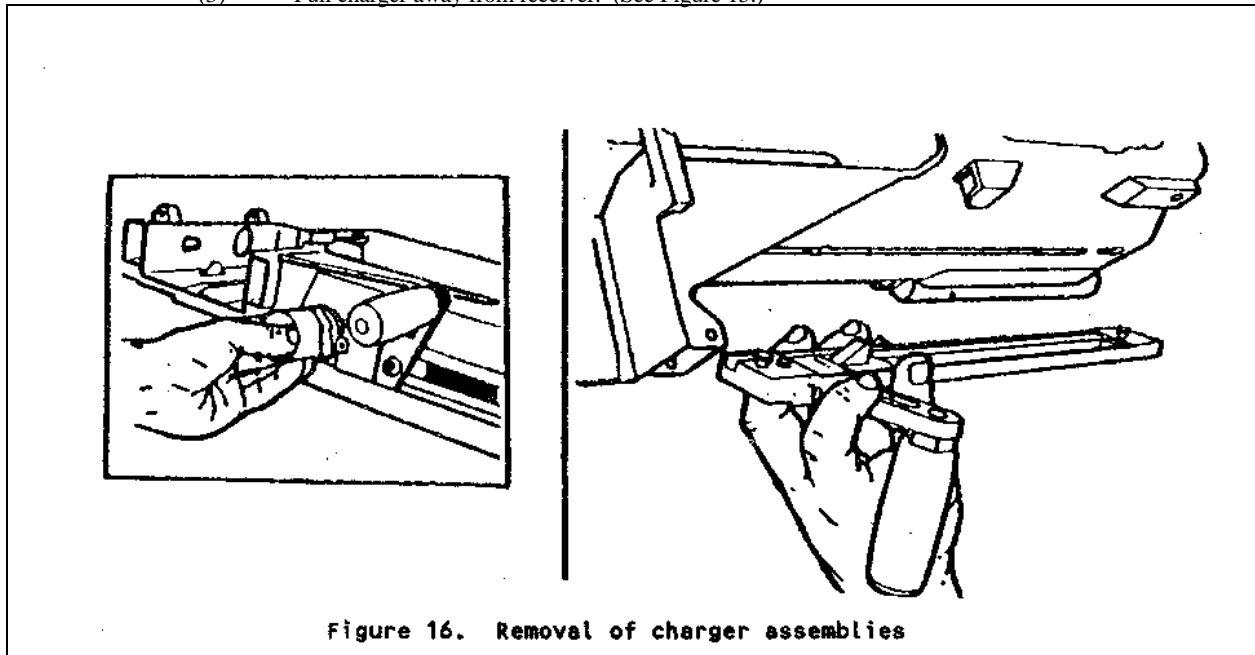


Figure 15. Removal of charger assemblies

- h. Remove the Sear Housing Assembly.
- (1) Turn receiver upside down and ensure safety is on "F" (fire).
 - (2) Lift lock pin with cartridge link.
 - (3) Press receiver sear (underneath safety) and rotate sear housing assembly 90 degrees in either direction. (See Figure 16.)
 - (4) Put safety in the S (safe) position and lift out sear housing assembly.

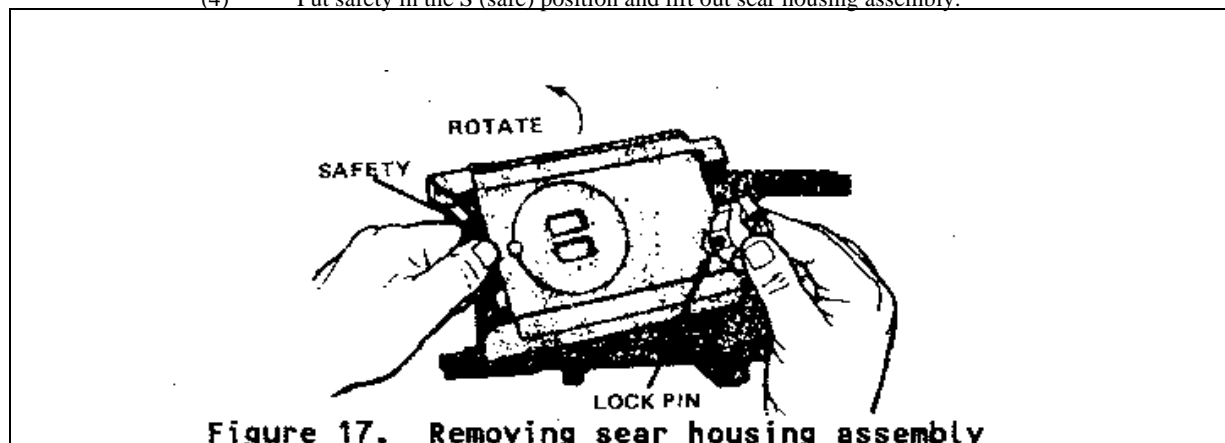


Figure 16. Removing sear housing assembly

- i. General disassembly is now complete. (See Figure 17.)

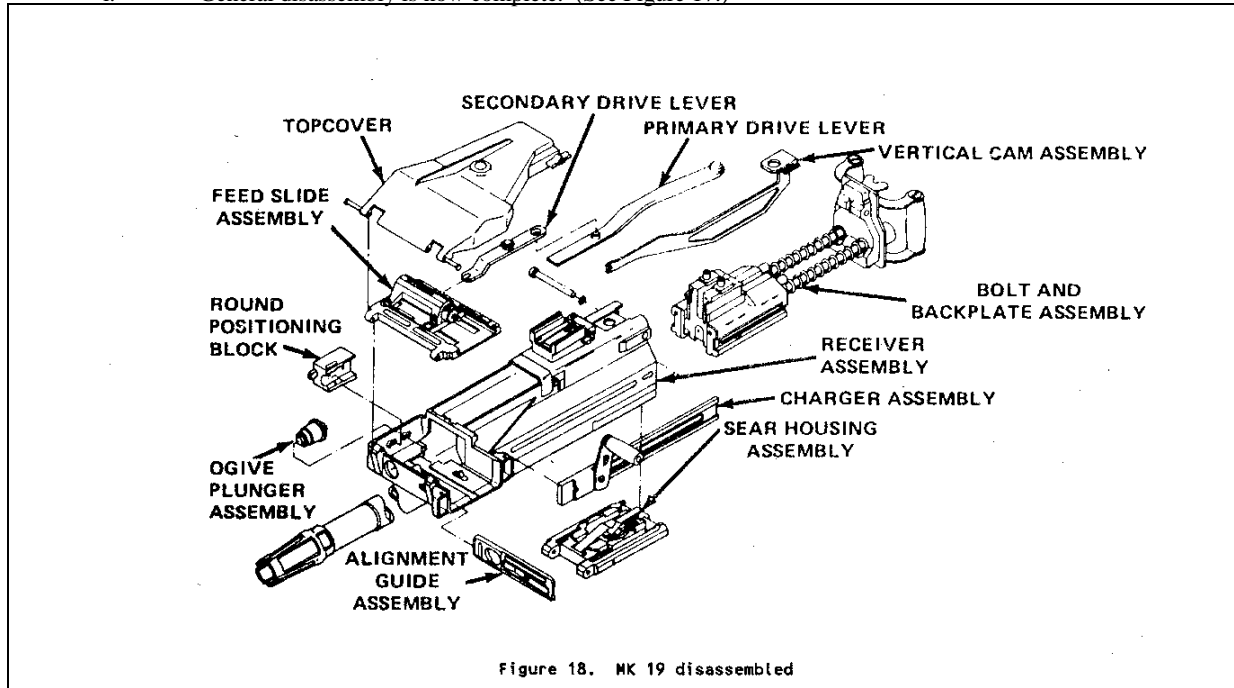


Figure 17. MK 19 disassembled

8. **General Assembly.** To properly assemble the five major groups of the weapon, replace the groups in reverse order of their removal.

- a. Attach the Sear Housing Assembly.
 - (1) Ensuring that the sear spring is held in position, line up the assembly at a 90 degree angle to the barrel centerline. (See Figure 18.)
 - (2) Put safety on "F" (fire).
 - (3) Turn the assembly 90 degrees toward the barrel centerline until the assembly locks into position.

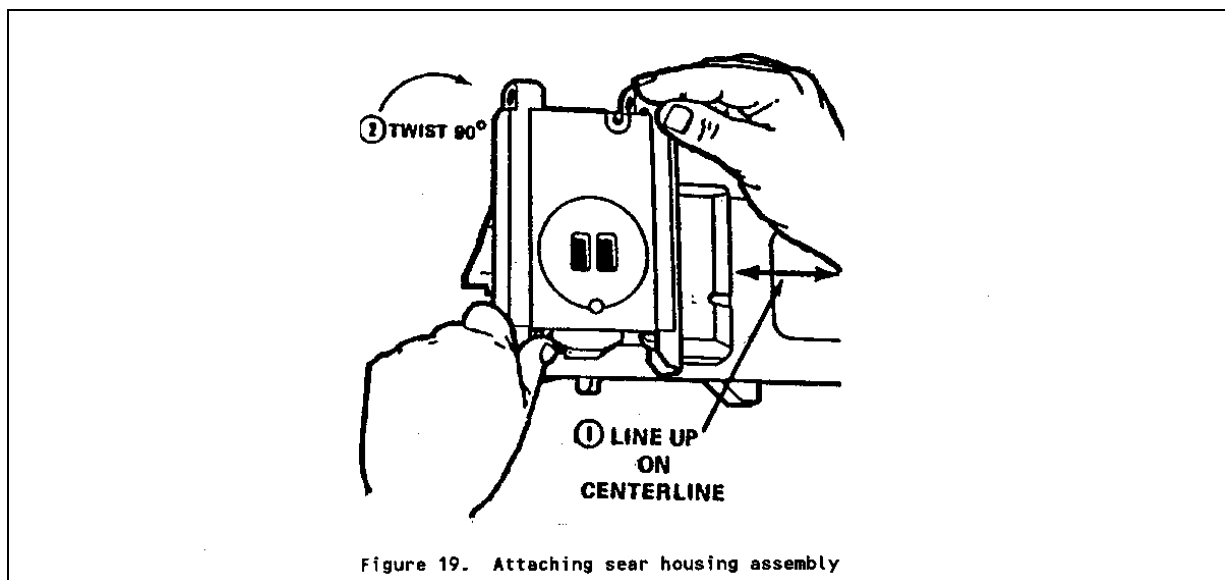


Figure 18. Attaching sear housing assembly

- b. Attach Charger Assemblies (both sides).
 - (1) Rotate charger handle to straight-up position. (See Figure 19.)

(2) Line up lugs on charger with slots in receiver rail. Insert charger tightly against rail.

(3) Slide charger forward until it locks in

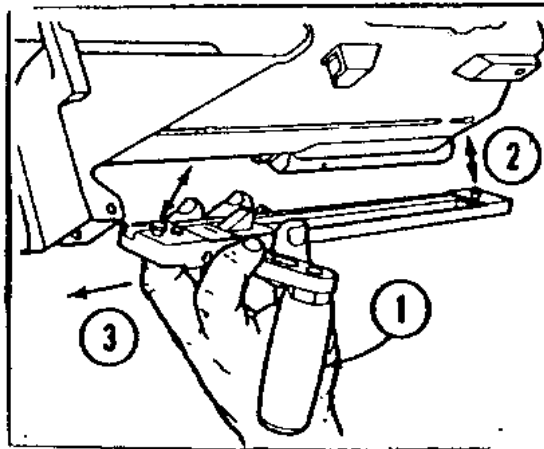


Figure 20. Attaching charger assemblies

place.

Figure 19. Attaching charger assemblies

c. Attach Round Positioning Block.

- (1) Insert block into slots. (Insert tang-end end forward). (See Figure 20.)
- (2) Push against block and slide it toward the rear until block locks in place.

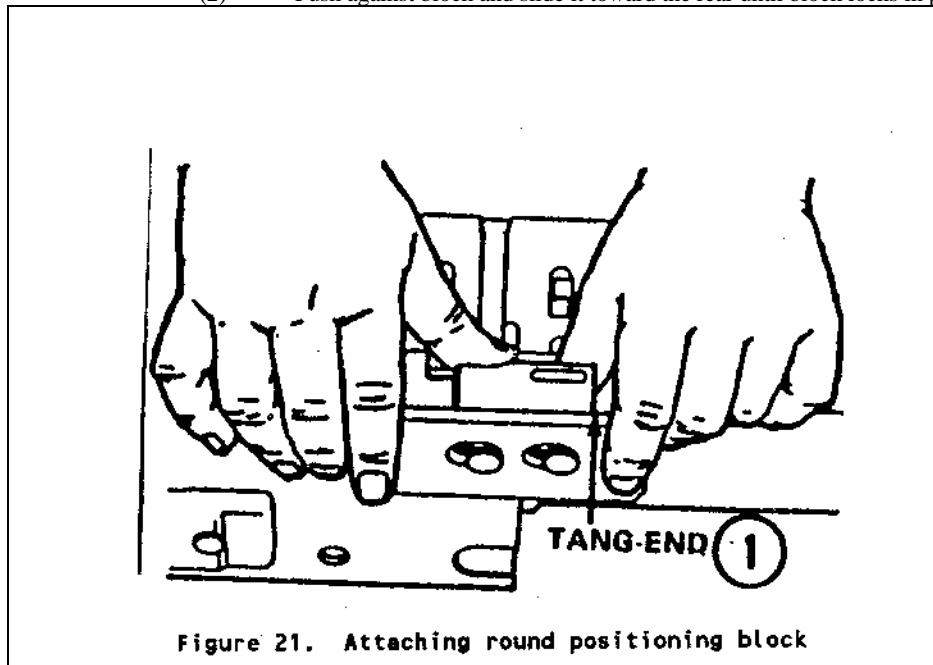


Figure 20. Attaching round positioning block

d. Insert Ogive Plunger Assembly.

- (1) Round positioning block must be in place.
- (2) Insert ogive plunger assembly as shown. (See Figure

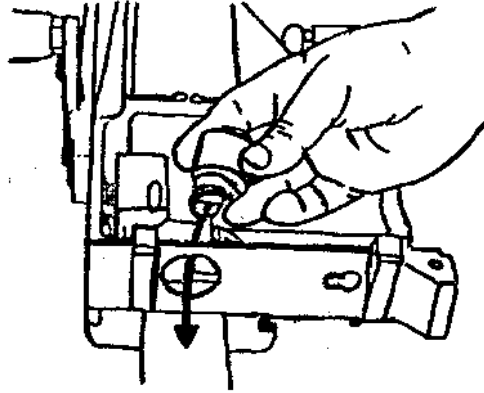


Figure 22. Inserting ogive plunger assembly

21.)

Figure 21. Inserting ogive plunger assembly

e. Insert Alignment Guide Assembly.

(1) Ogive plunger assembly must be in place.

(2) Insert lug on the guide to slot in receiver. Slide the guide (toward ogive plunger) until it locks in place. (See Figure 22.)

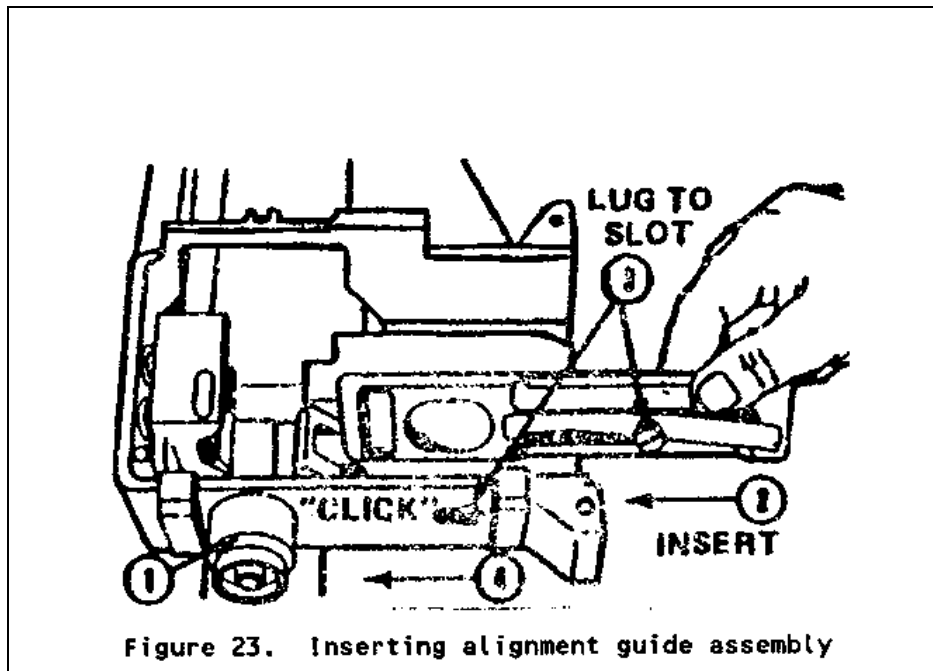


Figure 22. Inserting alignment guide assembly

- f. Engage Vertical Cam Assembly.
- (1) Slide vertical cam assembly through rear of receiver.
 - (2) Engage forked end in the notch.
 - (3) Hold vertical cam in place while you insert primary drive lever.

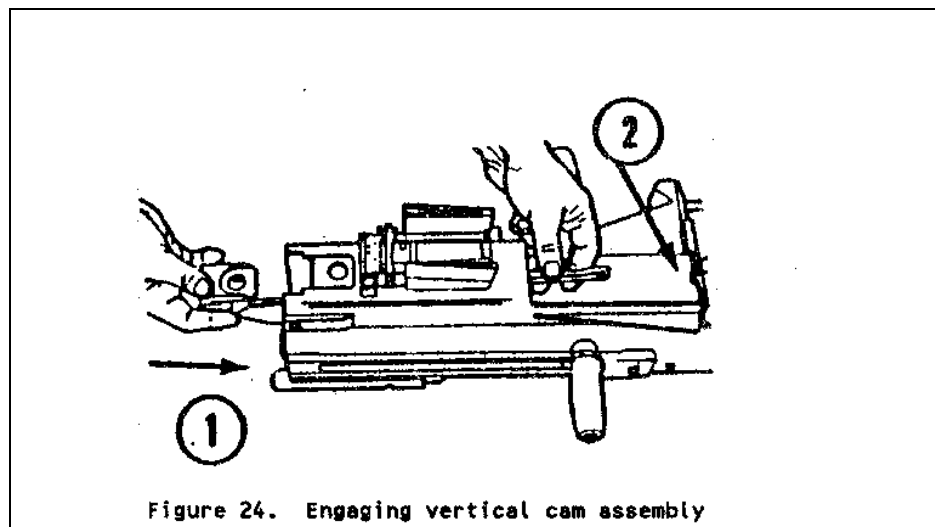


Figure 23. Engaging vertical cam assembly

- g. Engage Primary Drive Lever. (See Figure 24.)
- (1) While holding vertical cam assembly.
 - (2) Slide primary drive lever into receiver.
 - (3) Engage pivot post of lever through holes in receiver and vertical cam.
 - (4) Slide drive lever lock (on vertical cam) forward.

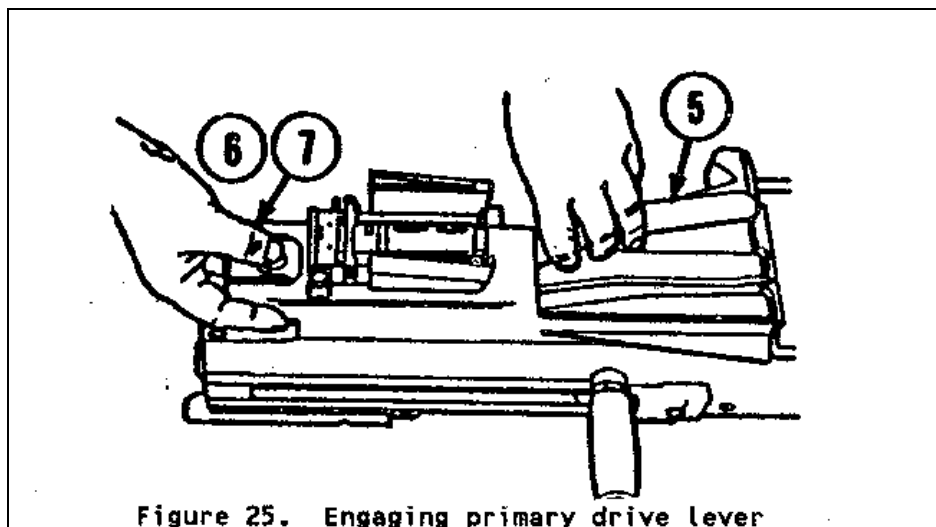


Figure 24. Engaging primary drive lever

- h. Attach Feed Tray and Feed Slide Assembly. (See Figure 25.)
- (1) Drop tray into top of feeder, recessed side up. Pinholes on tray should line up with lugs on receiver.
 - (2) Position feed slide assembly so that tabs are lined up with slots in tray.
 - (3) Insert tabs into slots. Drop feed slide assembly into tray.

NOTE: Feed slide assembly may also be inserted into tray before the tray is placed in the feeder.

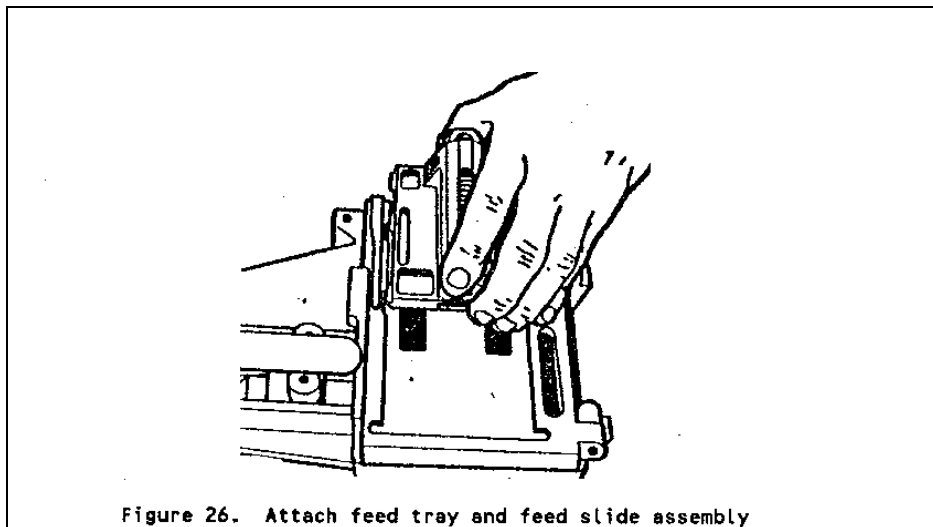


Figure 25. Attach feed tray and feed slide assembly

- i. Attach Top Cover Assembly. (See Figure 26.)
 - (1) With feed tray in place, line up: (a) pinholes in feed tray, (b) pinholes in top cover, and (c) receiver lugs.
 - (2) Hold top cover STRAIGHT UP. Insert top cover pins, both sides.

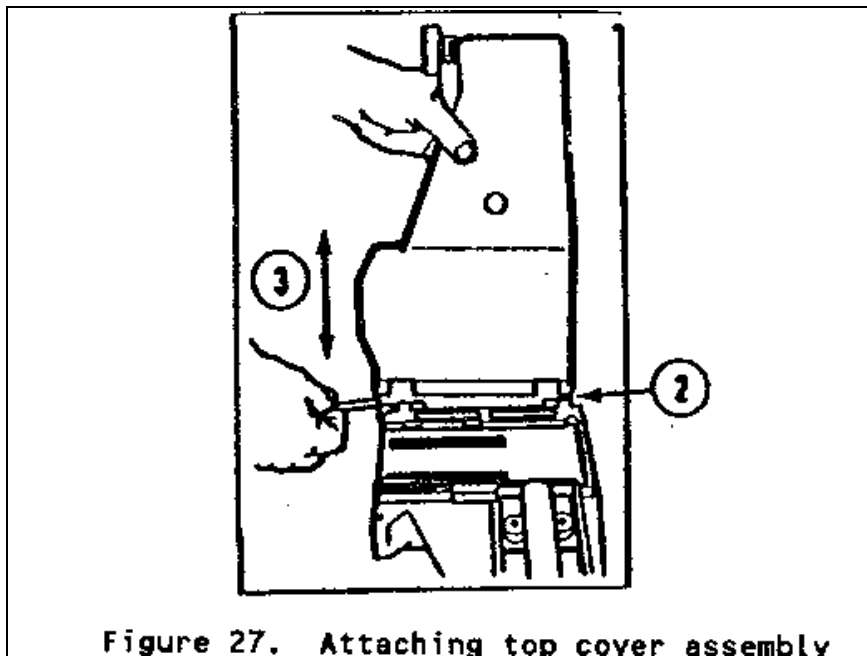


Figure 26. Attaching top cover assembly

j. Engage Secondary Drive Lever (See Figure 27.)

- (1) Lift the feed slide assembly and tray.
- (2) Insert forked end of secondary drive lever under feed tray. Engage the pin located under the tray.
- (3) Press raised pivot post through hole in top cover.
- (4) Press tray firmly against top cover.

CAUTION: If secondary drive lever is not properly engaged under the feed tray pin, gun will not fire and may be

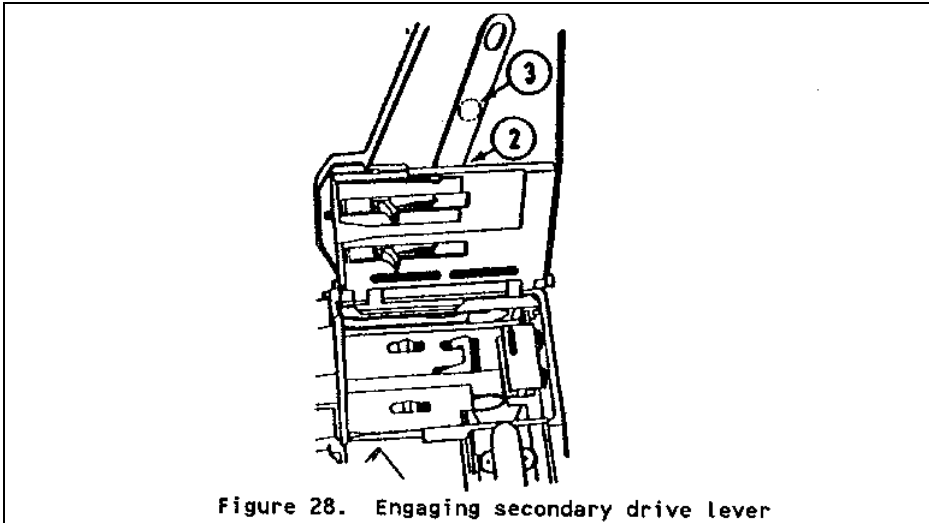


Figure 28. Engaging secondary drive lever

dangerous.

Figure 27. Engaging secondary drive lever

- k. Insert Bolt and Backplate Assembly. (See Figure 28.)

CAUTION: Before inserting assembly put cocking lever in forward position.

- (1) Make sure cocking lever is forward.
- (2) Insert bolt and backplate assembly into the receiver.
- (3) Press receiver sear.
- (4) Slide bolt and backplate assembly all the way forward.
- (5) Insert backplate pin to lock the assembly in

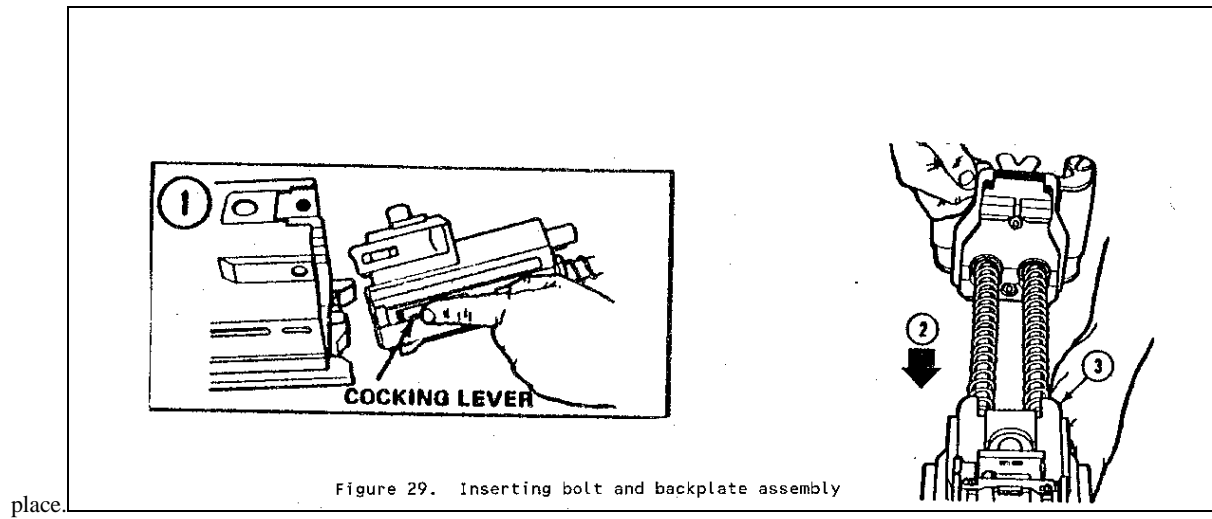


Figure 28. Inserting bolt and backplate assembly

CAUTION: Prior to closing the cover, ensure that the bolt is forward, and that the feed slide assembly is to the left.

1. Function Check. Prior to operating the weapon, the gunner should conduct a function check which includes the following steps:

- (1) Clear the weapon.
- (2) Pull bolt to rear, place safety on "S" (safe), and attempt to fire. If weapon fires, notify ordnance personnel.
- (3) With the bolt to the rear, place safety on "F" (fire) and attempt to fire. Ride the bolt forward.
- (4) With the bolt forward, open the cover and inspect the firing pin and bolt face for damage.
- (5) Ensure the secondary drive lever moves back and forth easily.
- (6) Press the feed pawls to check for spring tension.

9. References

- a. FMFRP 6-15 Machine Guns and Machine Gunnery
- b. TM 9-1005-213-10

B2161 HEAVY MACHINE GUNS 2

c. TM 08521A - 10/1A

d. Infantry in Battle Ch XVII